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EXAMINER

VARCOE JR, F

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 05/08/01

*9*

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
**09/252,507**

Applicant(s)  
**Held**

Examiner  
**Varcoe**

Art Unit  
**1764**



-- Th MAILING DATE of this communication appears on the cover sheet with the correspond nc addr ss --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1) ☒ Responsive to communication(s) filed on Feb 20, 2001

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

## Disposition of Claims

4) ☒ Claim(s) 1-44 is/are pending in the application.

4a) Of the above, claim(s) 33-44 is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1-32 is/are rejected.

7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirements.

## Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☒ All b) ☐ Some\* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

15) ☐ Notice of References Cited (PTO-892)

18) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

19) ☐ Notice of Informal Patent Application (PTO-152)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_

20) ☐ Other:

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## **DETAILED ACTION**

### ***Response to Amendment***

The amendment of February 20, 2001, has been received, as has the terminal disclaimer. Claims 1-44 are pending in this application. Claims 33-44 are non-elected and have been withdrawn from consideration but are not yet canceled. The provisional double patenting rejection has been withdrawn. The 35 U.S.C. §112 rejections have also been withdrawn.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 17-24, 28, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeshima et al. U.S. Patent No. 5,388,406.

With regard to claim 1, Takeshima discloses an internal combustion engine arrangement comprising a spark-ignited internal combustion engine. (Takeshima's claim 20, which depends on claim 1, specifies diesel, implying that claim 1 comprehends both diesel and spark-ignited engines.) Takeshima discloses an exhaust line receiving exhaust gas from the internal combustion engine (Takeshima claim 1). Takeshima discloses an oxide gas absorber in the

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exhaust line (claim 1) including a support member having a total surface area that is larger than that of the underlying area of the support member. Takeshima's monolith of sintered cordierite is coated with a slurry that results in a layer on the cordierite having greater surface area than the underlying cordierite, the cordierite in turn having a higher surface area than the underlying support member that supports the cordierite (column 4 line 56 to column 5 line 12). Takeshima discloses an absorption layer on a surface exposed to a flow of gas and capable of reversibly absorbing at least one nitrogen oxide and/or at least one oxide of sulfur (Takeshima column 1 line 60 to column 2 line 2).

The instant claim recites a control unit for controlling the temperature of the absorption layer by adjusting the composition parameters of the exhaust gas. This process is amplified at page 7 of the specification, which states that the temperature of the absorption unit can be controlled solely by changes in exhaust composition (present specification at page 7, lines 11-19). Takeshima discloses a control unit (ECU column 4 lines 1-13) for controlling the temperature of the absorption layer by adjusting composition parameters of the exhaust gas so that the absorption layer can be heated to a temperature at which the layer is regenerated by desorbing absorbed  $\text{NO}_x$  or  $\text{SO}_x$ . Takeshima accomplishes this by having his control unit control the fuel injector to provide a rich air-fuel ratio during regeneration (Takeshima column 9 lines 65-68).

Takeshima thus anticipates the invention of claim 1.

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With regard to claims 17 and 18, Takeshima discloses an absorption layer containing an element selected from the group consisting of alkali metals, alkaline earth metals, rare earths, lanthanum, titanium, copper and manganese (Takeshima column 4 lines 37-40), and where the absorption layer contains at least one of the elements barium, sodium and potassium (Takeshima column 4 lines 37-40).

With regard to claim 19, absorption from an exhaust gas with an excess of oxygen during lean operation of the internal combustion engine is an intended use and does not patentably distinguish the claim from the prior art.

With regard to claim 20, Takeshima discloses an absorbing layer releasing at least one of NO<sub>x</sub> and SO<sub>x</sub> in a reducing atmosphere or at low oxygen concentration (column 1 lines 32-35).

With regard to claim 21, Takeshima discloses an oxygen detection means (Figure 8 (74)) for providing a signal representing the oxygen concentration in the exhaust gas. Takeshima discloses control means for receiving a signal (66) representing oxygen concentration and causing charging or discharging or regeneration of the absorption layer (column 9 lines 41-58).

With regard to claim 22, Takeshima discloses an absorption layer that releases at least one of NO<sub>x</sub> and SO<sub>x</sub> at an elevated temperature (Abstract).

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With regard to claim 23, Takeshima discloses a temperature measuring means (16) and control means (66) for receiving the temperature signal and controlling charging or discharging of the gas absorption layer (column 9 lines 41-58).

With regard to claim 24, Takeshima discloses an arrangement comprising oxygen detecting means (Figure 8 (74)) generating a signal supplied to the control means (66). Takeshima also discloses a temperature measuring means (16) and control means (66) for receiving the temperature signal and controlling charging or discharging of the gas absorption layer (column 9 lines 41-58).

With regard to claim 28 Takeshima discloses an absorption layer including a precious metal (column 4 line 40).

With regard to claim 29 Takeshima discloses an absorption layer including an oxidation catalyst and a three-way catalyst (claim 16) containing the precious metal (column 4 line 40).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
4. Claims 2-11, 15, 16 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshima et al. U.S. Patent No. 5,388,406, as applied to claim 1 above, in view of Cornelison et al. U.S. Patent No. 5,240,682.

With regard to claim 2, Takeshima discloses essentially the same invention as that of the instant claim but fails expressly to disclose a metal support member.

Cornelison discloses a metal support member.

Cornelison and Takeshima are analogous art in that both deal with exhaust gas NO<sub>x</sub> removal.

At the time of the invention it would have been obvious to one skilled in the art to use the support material of Cornelison with the apparatus to Takeshima.

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The motivation would have been to utilize a metal thickness that was thin enough to be light weight and capable of accepting corrugation in a non-nesting pattern, such as herringbone or chevron and capable of over-folding (Cornelison column 4 lines 16-29).

With regard to claim 3, Cornelison discloses a metal support member that is a metal sheet or foil (Cornelison column 4 lines 16-29).

With regard to claim 4, the modified apparatus of Takeshima discloses a metal support member heatable by application of electric current (Takeshima column 3 line 43).

With regard to claims 5 and 6, Cornelison discloses a support member having a wall thickness less than or equal to 0.16 mm in the region provided with the absorption layer (column 4 lines 26-29). Specifically, Cornelison discloses a thickness of 0.0406 mm (0.0016 inches).

The motivation for combining metal support material this thin would have been to utilize a thickness that was thin enough to be light weight and capable of accepting corrugation in a non-nesting pattern, such as herringbone or chevron and capable of over-folding (Cornelison column 4 lines 16-29). Cornelison discloses a metal support member with a wall thickness less than 0.1 mm and 0.05 mm (column 4 lines 16-29). (A thickness of 0.001 inch is equal to 0.0254 mm, which is less than 0.05 mm.)



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With regard to claims 7-11, it is well-known in the art, as disclosed by Cornelison, to build exhaust treatment devices using a variety of internal shapes and configurations, including parallel passages with closed cross-section, structures that render the flow turbulent, corrugation, subdivided passages, and features having various lengths, cross sections and numbers of passages.

With regard to claims 15 and 16, Cornelison discloses an absorption layer containing gamma aluminum oxide (column 1 line 31).

With regard to claim 25 and 26, Cornelison discloses a support member made of a ceramic material (column 1 line 23) and of a metal foil (Abstract). The thickness of the absorption layer is a result-effective variable. It would have been obvious to one skilled in the art to experimentally determine the thickness that is thick enough to hold a sufficient amount of oxide gas without being so thick as to require unacceptably long purge times.

With regard to claim 27, Cornelison discloses an absorption layer applied as a wash coat (column 1 line 30).

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5. Claims 12-14 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshima et al. U.S. Patent No. 5,388,406 as applied to claim 1 above, in view of Neal et al., U.S. Patent No. 4,755,499.

With regard to claims 12-14, Takeshima discloses essentially the same invention as the instant claims but fails expressly to disclose an absorption surface with an area of at least 20 M<sup>2</sup>. Neal discloses an alumina substrate with a surface area above 100 square meters per gram (Neal column 5 line 30). This is above the lower limits presented in claims 12-14.

Neal and Takeshima are analogous art in that both deal with removing nitrogen oxides and sulfur oxides from gas streams.

At the time of the invention it would have been obvious to one skilled in the art to use material with a high absorption surface like that of Neal in the apparatus of Takeshima.

The motivation would have been to use sorbents that are outstandingly effective for the removal of nitrogen oxides and sulfur oxides from waste gas streams (Neal Abstract).

With regard to claim 30, Neal discloses an absorption layer with a pore volume of at least 0.2 cubic centimeters per gram of mass (column 6 lines 1-4).

With regard to claims 31 and 32, Takeshima discloses a separate oxidation catalyst exposed to the flow of gas (column 8 lines 38-40). Three-way catalysts catalyze oxidation.

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Varcoe, whose telephone number is (703) 306-5477. The examiner can normally be reached Monday through Friday from 9:00 am to 5:00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode, can be reached on (703) 308-4311.

The FAX telephone number for this Group Art Unit is (703) 305-3599 (for Official papers after Final), (703) 305-5408 (for other Official papers) and (703) 305-6357 (for Unofficial papers).

When filing a FAX in Group 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of the application. This will expedite processing your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

RV  
May 7, 2001

  
MARIAN C. KNODE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700



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